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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MILLER, MICHAEL G

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,459	Applicant(s) DECAMS ET AL.	
	Examiner MICHAEL G. MILLER	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Examiner notes the amendment filed 03 OCT 2008. The amendment introduces no new matter and is therefore accepted. The amendment alters Claim 1 and cancels Claim 10.

Response to Arguments

2. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection. Specifically, the prior rejection of Claim 1 and dependents does not properly teach a tri-component system for delivering the silver precursor.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

Art Unit: 1792

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
6. Claims 1-2, 6 and 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Vaartstra (U.S. Patent 6,010,969, hereinafter '969) in view of Welch et al (U.S. Patent 6,613,924, hereinafter '924).
7. Claim 1 – '969 teaches a process for depositing a silver film on a substrate.
 - a. The process comprises depositing silver on the substrate by chemical vapor deposition (Column 2 Line 66 – Column 3 Line 20 for CVD of metal precursors; Column 4 Lines 1-13 for the suitable metals (silver is a metal)) of a solution comprising a silver precursor, an amine and a solvent (silver precursor cited above, polyamine coordination compounds listed at Column 3 Lines 58-67, organic solvents cited at Column 4 Lines 37-44) wherein:
 - i. The silver precursor is a silver carboxylate in which R is a linear or branched alkyl radical that has 3 to 7 carbon atoms (Column 4 Line 45 -

Art Unit: 1792

Column 5 Line 3, explicitly Line 54 t-butyl which is the alkyl part of silver pivalate);

ii. The solvent has an evaporation temperature which is either less than or at least equal to the decomposition temperature of the silver precursor (inherent).

b. '969 does not teach the following claim limitations:

iii. The CVD occurs in a hydrogen or oxygen atmosphere.

iv. There is no discussion on the concentration of silver precursor in the solution.

v. There is no discussion on the volume relationship between the amine and the solvent.

c. Examiner takes the position that the concentration of silver precursor in the solution is a result-effective variable with regards to the deposition rate of the metal film; for a run of given duration, higher concentrations of silver precursor will lead to higher amounts of silver deposited on a surface, because there's more of it in a given volume. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to control the amount of silver precursor in the solvent to control the deposition rate, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

d. Examiner takes the position that the concentration of amine relative to the solvent is a result-effective variable with regards to the volatility of the silver

Art Unit: 1792

precursor. As taught in '969, the polyamine ligands fill the coordination sphere and make the metal precursor more volatile (Column 3 Lines 58-67). It stands to reason that as more amine is added, there is more chance for the polyamine to fill the coordination sphere and less chance for the solvent to fill it, thereby increasing the volatility. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to control the amount of polyamine relative to the solvent in order to control the volatility of the solution, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

e. '924 teaches MOCVD of silver films using either an inert or hydrogen atmosphere to deposit pure metal or using an oxygen atmosphere to deposit a metal oxide ('924 Column 4 Line 66 – Column 5 Line 11).

f. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the teachings of '969 and '924 as both teachings are performing MOCVD, '969 wants to deposit a metal film on a substrate, and '924 teaches that the metal film can be controlled in its physical properties by depositing in either a hydrogen or an oxygen atmosphere.

8. Claim 2 – as discussed above, '969 teaches silver pivalates.

9. Claim 6 – As discussed in Claim 1, Formula 2 is inclusive of polyamine compounds.

Art Unit: 1792

10. Claim 8 – ‘969 teaches glass and silicon wafers (Column 6 Lines 22-38).

11. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over ‘969/’924 in view of Budaragin (U.S. PGPub 2002/0041928, hereinafter ‘928).

12. Claims 3 and 4 – ‘969 mentions that organic solvents may be used to prepare the carboxylate for CVD but does not list specific examples. ‘928 teaches that toluene is a known organic solvent for carrying metal carboxylates in liquid suspension (‘928 PG 0040). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the teachings of ‘969/’924 and ‘928 because ‘969/’924 wants organic solvents that will keep metal carboxylates in solution and ‘928 teaches that toluene is capable of doing such.

13. Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over ‘969/’924 in view of Kuzmina (non-patent literature, applied in previous rejection).

14. Claim 5 – ‘969/’924 teaches wanting ligands around the metal precursor to coordinate with it and control its volatility and crystallinity, but does not specifically mention monoamines. Kuzmina teaches that monoamines, specifically diisopropylamine, work with silver pivalate to coordinate with the silver pivalate and discourage crystalline structures, increasing volatility (Section 3.4). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the teachings of ‘969/’924 and Kuzmina because ‘969/’924 wants to use ligands to control the coordination behavior of silver precursors and Kuzmina teaches that diisopropylamine is suitable for the purpose.

15. Claim 9 – Kuzmina teaches that it is known to deposit silver films based on silver pivalate compositions at 300 degrees Celsius (Section 2.1).

16. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over '969/'924 in view of Onoe et al (U.S. Patent 5,722,184, hereinafter '184).

17. Claim 7 - '969/'924 teaches wanting ligands around the metal precursor to coordinate with it and control its volatility and crystallinity, but does not specifically mention monoamines. '184 teaches that acetonitrile is capable of forming coordination complexes with metalorganic precursors for use in depositing said precursor onto a substrate to form a metal film ('184 Column 4 Lines 8-14.) Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the teachings of '969/'924 and '184 because '969/'924 wants to use ligands to control the coordination behavior of silver precursors and '184 teaches that acetonitrile is suitable for the purpose.

18. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '969/'924 in view of Steininger (U.S. Patent 4,703,028, hereinafter '028).

19. Claim 11 – '969 teaches deposition by CVD processes, including plasma enhanced CVD, but does not expressly teach cold plasma. '028 teaches the deposition of transition metal oxides by using either traditional MOCVD methods or a cold plasma-supported CVD method ('028 Column 2 Line 67 – Column 3 Line 8 and Column 1 Line 55-68). As MOCVD is a CVD method, it follows that a silver oxide film could be deposited by using cold plasma in conjunction with MOCVD. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was

Art Unit: 1792

made to have combined the teaching of '969 with the teaching of '028, as both methods want to deposit metal-containing films and '028 teaches a method that is complementary to the method of '969.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **MICHAEL G. MILLER** whose telephone number is (571)270-1861. The examiner can normally be reached on M-F 7-4.

Art Unit: 1792

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael G. Miller/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792